Fall 9-1-2000

FOR 347.01: Multiple Resource Silviculture

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FORESTRY 347
MULTIPLE RESOURCE SILVICULTURE
Autumn 2000

Instructor: John Goodburn
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Telephone: 243-4295 Email: goodburn@forestry.umt.edu
Office hours: Mon. 1:00-2:30 p.m., Thurs. 11-12 a.m. *(or by advance appointment)*

Lecture and Discussion	Mon. & Wed.	10:10 -11:00 a.m.	Rm. 301 Forestry Bldg.
Lab/Field Work	Thur.	2:10 - 6:00 p.m.	Rm. 206 Forestry Bldg.

(Field labs will meet at vans in parking lot south of Science Complex building)

Course Description

The Multiple Resource Silviculture course introduces the concepts behind various silvicultural techniques and their application in forest ecosystems to meet multiple resource objectives. Silviculture can be thought of as applied forest ecology. The subject matter will include coverage of silvics, forest dynamics, intermediate stand treatments, reforestation principles, even-aged and uneven-aged silvicultural systems, and ecological restoration techniques. We will discuss ecologically-based forest management strategies aimed at sustainable wood production, wildlife habitat enhancement, and the maintenance or
restoration of biological diversity, site productivity, and aesthetic quality.

This course integrates the biological principles of tree growth and regeneration (silvics) with the application of this knowledge to the management of forest stands (silviculture). *Silvics* is defined as the biological life histories and environmental requirements of forest trees. It includes such topics as soil and site requirements, pattern and rates of growth, competition, seed production and dissemination, and reproductive strategies. *Silviculture* is the theory and practice of influencing forest regeneration, species composition, and growth to accomplish a specified set of resource objectives.

Performance goals for students completing the Multiple Resource Silviculture course will include the following: Students should have a clear understanding of key ecological concepts related to forest stand development and the response of forest vegetation to silvicultural practices. Students should be familiar with the key silvical characteristics of the common tree species in the northern Rockies. Students should demonstrate a familiarity with silvicultural terminology and be able to discuss practical application of regeneration techniques, intermediate stand treatments, and alternative silvicultural systems. Students should be able to anticipate how different silvicultural practices might affect soil resources, forest health, wildlife habitat, biological diversity, wood production, water quality and yield, recreation, and aesthetics, Students should also gain an appreciation for the social dimensions of silvicultural planning and need to adapt silvicultural practices to meet landowner objectives.

Readings

Primary text: The Practice of Silviculture. Smith, Larson, Kelty, and Ashton. 1997.

Additional articles are available over the internet on the Mansfield Library website for Electronic Reserves (ERes). These required readings are listed on the syllabus by "name" and

author. They can be accessed on the web at http://eres.lib.umt.edu/. They will also be available as hardcopy versions on traditional reserves at the Mansfield Library for 2-hour loan.

Reading assignments are listed on the syllabus next to the planned lecture material. Please keep current on your assigned reading, as it will be critical both for your personal success in the course and for the success of our in-class discussions. **You are expected to have read the assigned readings prior to coming to class.** Lecture and discussion in class will proceed on the presumption that everyone has read the assigned materials. If necessary, we will have pop quizzes on the assigned readings.

Class Participation

Class participation is encouraged and will be incorporated into your grade. Your preparation and willingness to ask questions and discuss various topics will benefit not only your own learning experience, but also that of your colleagues in the class. Attendance at all scheduled lecture and lab sessions is expected, and unexcused absences could negatively affect your grade. Please notify me as soon as possible if you will be unable to attend class for some reason.

Labs

Thursday field labs will generally meet at the vans in the parking lot south of the Science Complex. Indoor lab periods will meet in Room 206 of the Forestry Buildings.
** Unless lab is scheduled to be indoors, always wear appropriate field clothes and footwear (boots) to labs. If rain is forecast, bring rain gear and do not expect lab to be canceled on account of bad weather. **
*** Please be on time for lab. We will often have a bit of travel to get to field sites (e.g., Lubrecht Experimental Forest) and may not be able to wait for you. ***

Drop in or drop me a line

You are encouraged to ask questions and initiate discussions both in and out of class. I am available during office hours or at other times if you wish to schedule an alternative time. Also feel free to contact me or clarify questions you have via email. Please do not wait until *after* an exam to ask questions!

Grading System

Silvics Quiz	-	7%
Lab assignments, Written exercises	-	28%
First midterm exam	-	15%
Second midterm exam	-	15%
Silvicultural prescription (paper)	-	10%
Class participation	-	5%
Final exam	-	20%

Special Accommodations

Students with disabilities who need accommodations should see me privately during my office hours to make arrangements.

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Course Outline and Reading Assignments *

Lecture/Lab Schedule

Date			Topic	Required Reading
Week 1				*Expected to be read prior to class period*
9/6	W		Introduction, course overview and objectives	
9/7	H	lab	The role of Silviculture in Ecosystem Management	**Chap. 1, Smith et al.****
Part I. Silvics and forest ecology as a basis for silvicultural planning				
Week 2				
9/11	M		Silvics of individual trees	
9/13	W		Regeneration ecology, Disturbances, Silvicultural systems	**Chap. 7**
9/14	H	lab	Forest composition and structure; measurements review/intro	(Pattee Canyton)
Week 3				**"Understory tolerance" *** **
9/18	M		Shade tolerance and other key silvical characteristics	**Barnes et al. 1998**
9/20	W		Site quality estimation; Site index problem set	**Chap. 9, pp 235-246.**
9/21	H	lab	Stand structure evaluation - (Lubrecht Experimental Forest)	
Week 4			**Quiz - Silvics**	
9/25	M		Ecological site classification; Use in silvicultural planning	
9/27	W		Forest stand dynamics, Interpreting Diameter/Age distributions	**Chap. 2**
9/28	H	lab	Silvicultural Inventory; Evaluating Stand and Tree Quality – (Rattlesnake Nat. Rec. Area)	
Part II. Intermediate Stand Treatments				
Week 5				
10/2	M		Stand density concepts; Natural self-thinning (Stem exclusion)	**Chap. 3**
10/4	W		Pre-commercial thinning; Commercial thinning methods	**Chap. 4 and 5**
10/5	H	lab	Mark thinning using stocking guides and crop tree release method - (Lubrecht forest)	
Week 6				
10/9	M		Application of thinning; Tree and Stand response to thinning	**Chap. 5**
10/11	W		Thinning frequency and intensity; Release and Improvement cuts	**Chap. 6, p. 131-133, 147-156**
10/12	H	lab	Montana DNRC Commercial thin; Regen cuts and stocking surveys – (Evaro, MT)	
Week 7				
10/16	M		Overview of silvicultural systems	**Chap. 11**
10/18	W		**Midterm Exam I** (Covering material through 10/11)	
10/19	H	lab	No Thursday Lab this week	
Part III. Management and regeneration of mature forest stands				
Week 8				**Chap. 12**
10/23	M		Silvicultural systems - Even-aged methods Clearcutting methods and regeneration alternatives	**"Regen of Douglas-fir" Strothman & Roy**
10/25	W		Seed tree method; Shelterwood method	**Chap. 14; "Oak Regen Problem" Lorimer 1989**
10/26	H	lab	Silv. prescriptions; Thinning as a tool of restoration ecology; (Lolo N.F., Ninemile R.D.)	

* Course outline and reading assignments may be subject to minor changes as necessary.

** Chapter numbers listed in Required Readings refer to The Practice of Silviculture text (Smith et al.) unless otherwise noted.

***Additional readings not in the Smith text are available over the internet on Electronic Reserves at the Mansfield Library (ERes). These readings will also be available as hardcopy on traditional reserves at Mansfield for 2-hour loan. Articles are listed under required reading with abbreviated title and author.

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Course Outline and Reading Assignments

Part III. Management and regeneration of mature forest stands *(cont.)*

Week 9

10/30	M		Silvicultural systems - Uneven-aged methods . Single-tree and group selection	**Chap. 15** **Chap. 17**
11/1	W		Harvest regulation; Calculation of allowable cut	**"Uneven- aged silv. and Ecosystem Mgmt", Guldin**
11/2	H	lab	Uneven-aged management on the Flathead Indian Reservation – (Arlee, MT).	

Week 10

11/6	M		Group selection - Objectives and Methodology	**"Applying group selection" Miller et al. 1995**

Part IV. Artificial Regeneration and Forest Tree Improvement

11/8	W		Tree planting and nursery stock Tom Corse, Tribal Forestry, Confederated Salish and Kootenai Tribes	**Chap. 10**
11/9	H	lab	Montana DNRC State Tree Nursery – (Missoula)	

Week 11

11/13	M		**Midterm Exam II** Covering material through 11/8	
11/15	W		Designing Silv. systems to maintain/enhance organic matter in soil & sustain productivity Mark VanderMeer, Watershed Consulting	**"Strategies for maintaining forest productivity", Bengston**
11/16	H	lab	No Thursday Lab this week	

Week 12

11/20	M		Genetic effects of Silvicultural Systems and Methods George Howe, Howe Forest Genetics Consulting (formerly USFS geneticist)	**"Genetic considerations" Adams et al. 1992**
11/22	W		No Class - Thanksgiving vacation	
11/23	H	lab	No Lab - Thanksgiving vacation	

Week 13

11/27	M		Site preparation - Alternative methods	**Chap. 8**
11/29	W		Methods and effects of herbicide applications	**Chap. 6, pp. 133-146.**

Part V. Silviculture for Alternative Objectives

11/30	H	lab	Silvicultural techniques for maintaining biological diversity	**"Creating a Forestry for for the 21st Century"**
(Lab lecture)			Strategies at the stand and landscape scales	**Kohm & Franklin 1997**

Week 14 **Chap. 20**

12/4	M		Management of Whitebark pine in high elevation ecosystems – guest speaker Cathy Stewart – USFS Ecologist, Lolo National Forest	
12/6	W		Silvicultural management of wildlife habitat (Mexican spotted owl and Red-cockaded WP) Carl Fiedler – Research Silviculturist, UM School of Forestry	
12/7	H	lab	Silvicultural Prescriptions; Modeling effects of management options over time	

Week 15

12/11	M		Silvicultural control of damaging agents	**Chap. 19**
12/13	W		Catch-up lecture	
12/14	H	lab	Review and questions?	

Finals Week

F 12/22 **Final Exam** 8:00 - 10:00 a.m.

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